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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/676,090	10/02/2003	Sachiko Hattori	402814	8382

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EXAMINER

CHACKO DAVIS, DABORAH

ART UNIT	PAPER NUMBER
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1756

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/08/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/676,090

Applicant(s)

HATTORI, SACHIKO

Examiner

Daborah Chacko-Davis

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 November 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- ☐ Notice of Informal Patent Application
- ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-2, and 7-8, are rejected under 35 U.S.C. 102(b) as being anticipated by U. S. Patent No. 6,287,955 (Wang et al., hereinafter referred to as Wang).

Wang, in the abstract, in col 13, lines 11-14, and lines 50-67, in col 14, lines 1-21, and in figures 19-24, discloses a process for leaving a photoresist buried (leaving photoresist in the via or trench) comprising forming an interlayer on a substrate, forming an opening in the interlayer, forming an inorganic low-k dielectric on the organic low-k dielectric (interlayer) including the opening, applying a photoresist layer on the interlayer (or the inorganic low-k dielectric layer) and in the via (opening) (see figures 22-23) and performing a lithographic exposure through a mask (mask with light shielding portion or light transmitting portion) (patterning) with the opening in the interlayer and the second film (inorganic dielectric layer) corresponding to the light shielding or light transmitting portion of the mask, and developing the photoresist and leaving a portion of the photoresist film within the via (or trench or opening) (see figure 24) (claims 1-2, and 7-8).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 3-6, are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent No. 6,287,955 (Wang et al., hereinafter referred to as Wang) in view of U. S. Patent No. 5,792,680 (Sung et al., hereinafter referred to as Sung).

Wang is discussed in paragraph no. 2.

Wang, in col 10, lines 38-49, discloses that the photoresist composition may be a positive working resist or a negative working resist and that the resist is patterned through a mask (claims 3-6).

The difference between the claims and Wang is that Wang does not disclose that the light shielding portion of the mask is smaller in area than the opening, and that the light-transmitting portion of the mask is smaller in area than the opening.

Sung, in col 14, lines 17-53, discloses that the transparent portions of the mask for the positive resist or the opaque portions of the mask for the negative resist is smaller in dimension than the pattern formed in the photoresist.

Therefore, it would be obvious to a skilled artisan to modify Wang by employing smaller dimensioned mask-transmitting and mask-opaque areas as suggested by Sung because Wang exposes the photoresist through a mask such that a portion of the resist is only left in the via or trench holes and Sung, in col 14, lines 16-59, discloses that using a mask pattern of smaller dimension results in a decrease in pitch distance i.e., increases pattern density.

Response to Arguments

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5. Applicant's arguments with respect to claims 1-2, and 7-8, filed November 20, 2006, have been considered but are moot in view of the new ground(s) of rejection.

A) Applicants argue that Ho does not disclose exposing a resist with a photomask having a light-shielding or a light transmitting portion substantially in the same form as the opening in the interlayer film, thereby burying the resist film inside the opening.

Ho is not depended upon to disclose patterning using a photomask with a light transmitting portion or a light shielding portion corresponding to the opening in the interlayer. See paragraph no. 2.

B) Applicants argue that neither Ho nor Sung teaches a light transmitting portion or light shielding portion smaller in area than the opening.

Ho is not depended upon to disclose this limitation. Sung is depended upon to disclose the use of photomask that has transparent portions or opaque portions smaller in area than the intended area to be exposed on the substrate i.e., the opening in the interlayer that has the photoresist coated in it.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not

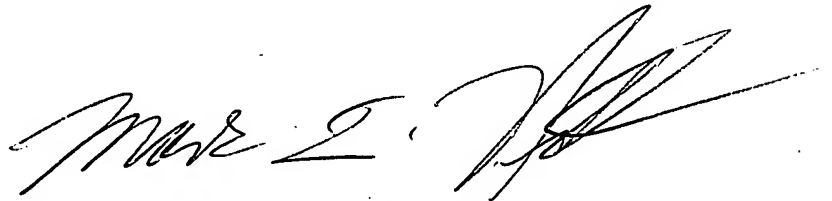
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mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daborah Chacko-Davis whose telephone number is (571) 272-1380. The examiner can normally be reached on M-F 9:30 - 6:00. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark F Huff can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

dcd

February 5, 2007.



MARK F. HUFF
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700